Notes from 4pi Workshop on May 13, 2004

For current documents and pictures see: http://kmheeger.lbl.gov/kamland/4pi/

** (action items)

Participants: Bruce Berger, Tim Classen, Andrew Franck, Stuart Freedman, Fred Gray, Karsten Heeger, Jordan Meyer, Kengo Nakamura, Herb Steiner, Don Syversrud, Joe Wallig

General Issues and Comments

1. Kengo pointed out that the 4pi installation is the *'next big detector upgrade'* before the ^{7}Be phase.
2. Kengo recommended not to install 4pi system in the winter time.
3. Kengo and Karsten discussed the on-site manpower during the 4pi installation, commissioning, and operation. Karsten will be present during the entire time of the installation and commissioning. Andrew Franck, a UC Berkeley technician with the 4pi group will provide extended on-site support for the installation and operation of the new calibration system. During the installation and commissioning of the new hardware Karsten and Andrew will be assisted by
    - Don Syversrud (lead technician)
    - Fred Gray (control software expert)
    - hopefully Tim and/or Evgueni (calibration experts)
    - Bruce Berger (experienced in on-site work)
    - Herb Steiner (head of calibration group)
    - Stuart Freedman (for critical decisions)

The Berkeley 4pi team will be responsible for the commissioning of the hardware and for training calibration experts to use the new system. Karsten will attempt to become proficient in the use of the existing z-axis calibration system prior to the installation of the 4pi system.

Motors and Motor Enclosure

** Jordan to implement emergency motor stop without resetting controls.

** Do we need Teflon cables inside sealed motor enclosure, or can we use existing yellow ones? KMH and Herb will investigate.

Controls

** Fred to add cross-check between reading of encoders and log file.

** Evaluate temperature dependence of pressure reading, do we need a thermometer?

Instrumentation

LEDs

Herb made a test of 860nm LEDs at Berkeley Lab. They appear to be invisible to PMTs but cans be seen by the CCD cameras. It was suggested to make an in-situ test in KamLAND. Kengo is taking a couple of 860nm LEDs back to Mozumi.

** Herb, KMH to ask Evgueni to perform LED deployment.

Materials Testing

The existing draft plan for materials testing and certification can be found at:
http://kmheeger.lbl.gov/kamland/4pi/materials&cleanliness/4pi_materialsplan_041504.pdf
This plan is currently being discussed with Andreas and others. A revised version will be posted soon.

In addition, we talked about the following issues:

Low Background Counting at KamLAND

The soak samples for the 4pi system are currently stored in the purification area. Christopher is planning to set up procedures for the counting facility before his departure. Tim volunteered to assist with the necessary measurements for the 4pi system. Kengo asked about calibrations of the on-site counting facility.
** KMH to contact Evgueni and Christopher about getting data from the counting facility and to ask Christopher about calibrations for the on-site counting facility.

Spectrometer Measurements at KamLAND

The spectrometer on site belongs to RCNS. Ogawa-san is knowledgeable about its use. Kengo will ask if someone from RCNS can assist us with making the measurements of the soak samples. Herb raised the issue about chemical changes in the scintillator. How do we test for this?
** Herb will discuss this issue with the calibration group.

Tests of the Deployment system

The deployment system will be tested in the high bay area in Bldg 51. We will simulate all motions and steps of the commissioning phase as well as the actual deployment. Kengo recommended to have a 6" tube attached to the glove box base plate to simulate the flange stack on the calibration deck.

During the test in the high bay area in Bldg 51 we will also test the accuracy of the positioning with the cables and pulley encoders. Separate tests of the accuracy and linearity of the pressure sensors in water are being conducted. Herb is leading a program to test the visibility of infrared LEDs which we plan to use for off-line position reconstruction with the CCD cameras.

Installation and Commissioning

The workshop attendants discussed the commissioning and installation plan as outlined in the 4pi presentation at the collaboration meeting. Tim suggested to perform a full scan of z-axis calibrations right before the installation of the new hardware. This will allow a detailed comparison of the calibrations performed with the new and old system.

The new deployment system will first be used for regular z-axis calibrations and the results compared to the z-axis scan before the installation. If any differences in the z-axis calibrations are found it is possible to revert to the old z-axis source deployment system. Tim suggested to consider the possibility of using the existing z-axis cable and source attachment

with the new spool system. This would allow us to revert to the old z-axis deployment cable without having to replace the deployment hardware.

The 4pi group plans on using 1 shift/day for the installation of the hardware. If necessary the regular shift may be extended by some time to finish a day's work but we will not plan on having multiple shifts per day.

Status and Schedule

Pictures of the current deployment system can be found at:
http://kmheeger.lbl.gov/kamland/4pi/pics/2004May16/index.htm

It was agreed upon that the next milestone is the test and demonstration of the complete 4pi system in the high bay area of Bldg 51 at Berkeley Lab. The collaboration will be invited to attend and review this demonstration.

An email update on the progress of the testing of the 4pi system will be circulated regularly to the calibration group and key experts of the collaboration. Kengo recommended that the following RCNS members should be included in regular discussions and updates:

Koga
Kengo
Kishimoto
Ogawa
Mitsui
Inuoue

Approval

Kengo reminded us that the extension to the glovebox will need to be approved by the fire marshall.

Misc Questions and Suggestions

** What is volume deplacement of the 4pi system?

** Herb suggested the use of inclinometers to determine the orientation of the pole. Herb will investigate.

May 16, 2004
KMH